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AID Report 61-75 22 May 1961

ITEM OF INTEREST

Prepared by

790212

Science and Technology Section
Air Information Division

SUBJECT: Liquid Metals as Heat Carriers

SOURCE: Novozorov, B. A. On the electrolytic transfer of oxygen in liquid sodium. Zhurnal fizicheskoy khimii, v. 35, no. 3, Mar 1961, 620-623. QD1.Z5, v. 35. (S/076/61/035/003)

In connection with the known presence of Na_2O in liquid sodium, which is often employed as a heat carrier, the question of possible electrolytic transfer of oxygen in the medium arises. This article describes an experimental check on this phenomenon conducted by the d-c polarization method. The experiments were run at 300°C.

An accumulation of transferred oxygen was actually determined in the anodic part of the molten metal. The findings confirmed the initial assumption that transfer is caused by O^{--} ions, which originate from the strongly polarized molecule of Na_2O and which are probably enclosed into a solvate-type envelope of Na^{+} ions. An approximate balance of the quantities of oxygen transferred and coulombs expended strengthen the probability of the transfer by O^{--} ions. A similar phenomenon has been observed for the transfer of sulfur under similar conditions.

COMMENT:

The study is interesting because of the possibility that it may refer to maintenance and safety problems in the use of liquid sodium as a heat carrier -- the problem of electrolytic corrosion in a nuclear reactor, for example. The assumption of oxygen transfer in ionic form in molten metals may well be a new approach to the problem.

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